

Chapter #6

THE ROLE OF COGNITIVE BIAS DISTORTIONS IN PATHOLOGICAL GAMBLING

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ABSTRACT

Several factors are related to the onset and the maintenance of pathological gambling. An important role is carried out by cognitive bias distortions, which represent real “errors” in the reasoning processes. The aim of this study is to analyze these cognitive errors in two groups of gamblers.

A total of 323 gamblers (131 males and 192 females), average age 25.31 (SD = 10.55), was recruited in various gambling rooms, and at the University of Florence. All participants completed the Italian version of the *South Oaks Gambling Screen (SOGS)* and were divided in two groups on the basis of their questionnaire score: a clinical sample composed of 62 pathological gamblers (SOGS score above 5); and a non-clinical sample composed of 261 non-problematic gamblers (SOGS score below 3). All participants completed the Italian version of the *Gambling Related Cognitions Scale (GRCS)*, which assesses 5 dimensions related to cognitive distortions: *Illusion of control*, *Predictive control*, *Interpretative bias*, *Gambling expectancies*, and *Perceived inability to stop/control gambling*.

Results. Our findings support the results of previous investigations on gambling-related cognitive biases. Specifically, pathological gamblers showed higher levels in all cognitive bias distortions considered when compared to non-problematic gamblers.

Keywords: gambling, cognitive distortions, cognitive bias.

1. INTRODUCTION

Pathological gambling (PG) is a behavioral addiction that has been associated with cognitive distortions in the processing of chance, probability and skill (Michalczuk, Bowden-Jones, Verdejo-Garcia, & Clark, 2011).

In particular, the studies conducted according a theoretical cognitive model, which constitutes the theoretical framework of this study, emphasize the irrational thought processes underlying the typical behavior of the gambler (for example, not being able to stop gambling) and assume that these cognitive distortions are responsible for the maintenance of the excessive gambling behavior (Ladouceur & Walker, 1996). Cognitive distortions could be defined as real “errors” of thinking processes, due to the cognitive limits of the intellect, and to the necessity of making quick decisions. In general, the gamblers’ cognition is the tendency to overestimate the chances of winning, caused by different cognitive distortions in the processing of chance, skill and probability (Ladouceur & Walker, 1996; Clark, 2010). Other cognitive biases associated with gambling involve selectively remembering wins while not considering losses experienced, overestimating the odds, superstitious behaviors, and the belief that a future win or loss is related to past gambling experiences (“gambler’s fallacy”) (Xian et al., 2008).

According to this theoretical model, cognitive distortions have been thought to play an important role in the development and maintenance of pathological gambling

(Cunningham, Hodgins, & Toneatto, 2014; Goodie & Fortune, 2013; Myrseth, Brunborg, & Eidem, 2010).

A substantial amount of literature has shown that irrational beliefs characterize casual, regular, and pathological gamblers (Gaboury & Ladouceur, 1989; Blaszczynski & Nower, 2002; Toneatto, Blitz-Miller, Calderwood, Dragonetti & Tsanos, 1997; Walker, 1992), and that they are present both in people who choose to play games determined totally by chance and in people who like games in which ability is combined with the component of chance (Baboushkin, Hardoon, Derevensky, & Gupta, 2001; Myrseth et al., 2010).

Using the “thinking aloud method”, many studies have identified the main existent gambling related biases and distorted cognitions (Raylu & Oei, 2004; Toneatto, 1999). In particular, an interesting study by Gaboury and Ladouceur (1989) verified that individuals outside the game session (before and after) perceived and described adequately that the game was influenced by chance and luck. The erroneous verbalizations were focused during the game session. The researchers then hypothesized the existence of two cognitive structures about the game in the minds of gamblers: one rational, outside the game session, and one irrational, stimulated by the characteristics of the game itself. Outside of the game session, people denied having so many misperceptions while they were playing (Ladouceur, 2001).

Walker (1992) found that 77% of regular slot machines gamblers claimed that there were no skills in the game. He also reported that gamblers expected that they would lose money in the long run. At the same time, during the game session, they emitted many erroneous perceptions about the outcome of the game.

These results were also supported by a subsequent study by Moore and Ohtsuka (1999). These authors found that a majority of their young participants (80%) were able to realistically assess having partial (or minimal) control on the outcome of the game, but this was not sufficient to make them less vulnerable due to cognitive distortions while they were playing.

All these findings support the Gaboury & Ladouceur study (1989), in which two different, rational and irrational, processes of thought are active in the minds of gamblers, and the most likely process that leads a person to move from a rational to an irrational thought operates at a subconscious level.

More recently, Ladouceur and Sévigny (2003) suggested the “double-switching” theory to explain the transition from a rational and correct perception of the outcome of a game (switch on) to a behavioral manifestation of irrational beliefs on gambling during a session of the same game (switch off). Authors argued that during the game sessions, rational thoughts are denied, and that if this did not happen, the gambler would be forced to admit that the outcome of the game would depend on chance and, consequently, would diminish the excitement it brings.

Using the “think aloud method”, Ladouceur (2004) investigated the difference in cognitive distortions among a sample of non-pathological gamblers (NPG) and a sample of pathological subjects (PG). Findings showed that, although pathological gamblers had issued a higher number of erroneous beliefs, the difference between the two samples was not statistically significant. However, the most relevant difference between pathological and non-pathological gamblers was the degree of belief in the wrong perceptions: pathological gamblers seemed to process information in a way that would increase their belief in their own misperceptions. Therefore, after a series of consecutive losses, the pathological gambler feels the need to continue to play, or to return the next day to play, to recover losses (Blaszczynski, 2000; Ladouceur, Sylvain, Boutin, & Doucet, 2002; Milton, 2001). Despite the fact that this study by Ladouceur (2004) did not show a

statistically significant difference in the number of misconceptions between pathological and non-pathological gamblers, other studies did find a positive association between the irrational and excessive activity of gambling (Walker, 1992), showing how irrational beliefs are more prevalent in pathological gamblers, or gamblers at risk, than in recreational gamblers, with statistically significant differences (Blaszczynski & Nower 2002; Joukhador, Blaszczynski & Maccallum, 2004; Toneatto et al., 1997).

2. BACKGROUND

At present, the role of cognitive biases and distortions in the etiology, maintenance, and treatment of pathological gambling has received wide attention in research (Goodie & Fortune, 2013).

Using psychometric measures, such as the Gambling-Related Cognitions Scale (GRCS; Raylu & Oei, 2004), or the Gambling Beliefs Questionnaire (GBQ; Steenbergh, Meyers, May, & Whelan, 2002), several studies have consistently shown that problematic or pathological gamblers are more likely to endorse cognitive distortions, and present a greater number of erroneous ideas and higher trust in these ideas than non-problematic gamblers. Moreover, cognitive distortions are found to be correlated with game intensity. Therefore, a greater level of gambling activity corresponds to higher levels of distorted beliefs (Cunningham et al., 2014; Emond & Marmurek, 2010; Joukhador, Maccallum, & Blaszczynski, 2003; Joukhador et al., 2004; Miller & Currie, 2008; Myrseth et al., 2010). In particular, one of the defining features of gamblers' cognition is the tendency to overestimate their chances of winning (Ladouceur & Walker, 1996; Clark, 2010).

Cognitive distortions can be considered real "errors" of reasoning processes, due both to the "natural" cognitive limits of the mind and the need to make decisions in the shortest possible time, in order to adapt to environmental demands.

The first of these cognitions, named *Illusion of Control*, reflects the belief that the gambler could control gambling outcomes via personal skill, ability, and knowledge. This cognitive distortion includes both active and passive illusion of control. The active one consists in illusionary belief relying on superstitious behaviors; therefore, the possession of particular objects, or performing specific rituals, could influence gambling outcome. The passive illusionary control refers to the tendency of interpreting luck or success in some field of life as signs of success equivalent to gambling, as well as the tendency to glorify personal gambling skills, or the ability to win, and therefore minimize the skills or abilities of other gamblers to win.

The second cognitive distortion, named *Predictive Control*, refers to errors regarding the nature of probability, and includes the beliefs of the gambler and the ability to accurately predict gambling outcomes, starting from salient past wins or losses, so the gambler predicts that, after a series of losses, a series of winnings will surely follow.

The third cognition, named *Interpretative bias*, consists of attributing wins to one's own skills, and losses to external influences, or in recalling successes more easily than losses.

Another cognitive distortion, the *Gambling Expectancies*, includes all expectancies related to gambling developed through exposure to gambling models, as well the media and cultural rituals, and through one early gambling experience. On the basis of these experiences, expectancies make gambling the only way to cope with stress and motivate the individual to continue to play, despite persistent and heavy losses.

The last cognition, *Perceived Inability to Stop Gambling*, is very similar to one's perceived inability to resist drinking or other addictive behaviors, and the incapacity to stop

gambling, especially when they become aware of the problem (Oei & Burrow, 2000; Sharpe, 2002). Ladouceur and Walker (1996) suggested that gamblers tend to have a biased perception of randomness linked to the gambling. They develop an illusion of control and superstitious beliefs that would allow them to control and predict events, which in reality are random. Also, these biases motivate them to develop strategies and skills to increase their winnings (Xian et al., 2008). Therefore, the gamblers fail to recognize the lack of a causal link between their behavior and gambling outcomes. Other gambler cognitive biases include selectively remembering wins, without, however, taking into account the many losses, and the “gambler’s fallacy”, that is, the belief that a future win or loss is related to past payoffs, when, in fact, each gambling event is discrete (Xian et al., 2008). These concepts are presumed to contribute to gambling problems by affecting the gamblers’ interpretations of their chances of winning, their subjective feeling of control over outcomes, their attributions for failure, their justifications for continuing, and their estimations of their skills or abilities (Breen, Krudelbach, & Walker, 2001; Toneatto, 1999).

Despite the comprehensive and consistent literature discussed before, there are few studies that examine these aspects in the Italian context. The present study aims to replicate existing data in a sample of Italian gamblers. In particular, the main focus of this study was to analyze the specific cognitive distortions that characterize pathological gamblers. In line with a majority of previous research (Blaszczynski & Nower 2002; Joukhador et al., 2004; Toneatto et al., 1997; Myrseth et al., 2010), we expected that pathological gamblers, in comparison to non-pathological gamblers, would have greater difficulty in stopping gambling, and present a higher tendency to overestimate their chances of winning due to the false belief that gambling outcomes can be influenced and controlled by developing strategies related to their superstitious beliefs.

3. METHOD

3.1. Participants and procedures

A total of 323 participants, average age 25.31 (SD = 10.55), was recruited for the present study and divided in two groups: I) a clinical group composed of 62 pathological gamblers (55 males and 7 females); and II) a control group of 261 (76 males and 185 females). All participants came from the central part of Italy, specifically the area around Florence. Ninety-six percent were Caucasian and 92% were Catholic. They came from a middle socio-economic level with more than 60% having a high school diploma or university degree. In addition, 71% of the participants have a stable job or are university students.

All participants were recruited from different gambling rooms and from the University of Florence. Inclusion criteria for the pathological gamblers group and social gamblers group was the score obtained on the South Oaks Gambling Screen, described below. Specifically, the pathological gamblers group is composed of gamblers whose scores were greater than 5, and the control group included students whose scores were less than 3.

All participants completed the questionnaires anonymously after signing an informed consent form. Several trained researchers assumed the task of data collection. Researchers went to different gambling rooms and university departments and asked for volunteers to collaborate. Participation in the survey was voluntary, and no monetary reward was given. In addition to the questionnaire on gambling, used to create the two groups, all subjects were measured to assess the presence of possible cognitive distortions.

3.2. Measures

Pathological gambling: The Italian version (Capitanucci & Carlevaro, 2004) of the South Oaks Gambling Screen (SOGS) developed by Lesieur and Blume (1987) was employed to assess the severity of gambling problems. The SOGS is a 20-item questionnaire based on Diagnostic and Statistical Manual (DSM)-III criteria to screen for life-time pathological gamblers that provides a range of information, such as the type of game preferred, frequency of gambling activities, difficulty to play in a controlled way, awareness about the problem of the game, attempts to return to play to recover money lost, leaving work or school, amount of loans requested, etc. The internal consistency coefficient was satisfactory, with a Cronbach's alpha of .69 in the general population and .86 in gamblers' samples (Stinchfield, 2002).

Cognitive distortions: The Italian version (Iliceto & Fino, 2014) of the Gambling Related Cognitions Scale (GRCS), developed by Raylu and Oei (2004), was administered in order to measure cognitive distortions. The GRCS consists of 23 items which assess five dimensions, plus a total score of cognitive distortion: Predictive Control (e.g. "Losses when gambling is bound to be followed by a series of wins"); Illusion of Control (e.g. "Specific numbers and colors can help increase my chances of winning"); Interpretative Bias (e.g. "Relating my losses to bad luck and bad circumstances makes me continue gambling"); Gambling Expectancies (e.g. "Having a gamble helps reduce tension and stress"); and Inability to Stop Gambling (e.g. "It is difficult to stop gambling as I am so out of control"). Each item was rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Internal consistency coefficients (Cronbach's alpha) for the Predictive Control, Illusion of Control, Interpretative Bias, Gambling Expectancies, and Inability to Stop Gambling were .77, .87, .91, .87, .89, respectively (Raylu & Oei, 2004).

3.3. Data analysis

In order to investigate whether social and pathological gamblers differ on cognitive bias and distortions, a single-factor between subjects multivariate analyses of variance (MANOVA) was performed with the variable Group (social gamblers vs. pathological gamblers) as independent variable, and the five cognitive bias subscales (*Illusion of control*, *Predictive control*, *Interpretative bias*, *Gambling Expectancies*, and *Perceived inability to stop/control gambling*) and the total score of the GRCS as dependent variables. All analyses were performed through IBM.SPSS 22.

4. RESULTS

MANOVA showed a significant multivariate effect, Wilk's $\Lambda = .43$, $F(317, 5) = 82.50$, $p < .001$. As subsequent univariate analyses of variance (ANOVAs) indicated, this main effect was due to a main effect of group on all variables considered. More specifically, pathological gamblers have significantly higher scores on illusion of control, predictive control, interpretive bias, gambling expectancies, perceived inability to stop/control gambling, and total score of the scale than social gamblers. Table 1 shows the descriptive and statistic results of MANOVA analysis.

Table 1. Differences in the GRCS mean scores between the two groups of Social and Pathological Gamblers.

	Social gamblers (n=261)		Pathological gamblers (n=62)		F(1,321)	p	η^2
	M	SD	M	SD			
Illusion of control	4.82	2.25	8.37	4.80	74.44	.000	.19
Predictive control	7.81	3.89	13.73	6.87	82.53	.000	.21
Interpretative bias	5.03	2.76	11.14	6.12	140.83	.000	.31
Gambling expectancies	5.01	2.87	11.71	5.96	167.80	.000	.34
Perceived inability to stop/control gambling	5.77	2.24	17.63	8.27	412.28	.000	.56
Total cognitive bias	28.44	11.71	62.58	26.36	240.05	.000	.43

4. CONCLUSION

Past research has consistently shown that cognitive distortions are typical characteristics of gamblers. These erroneous beliefs in the processing of chance, skill, and probability affect the gamblers' tendency to overestimate their chances of winning (Ladouceur & Walker, 1996; Clark, 2010). Moreover, such cognitive distortions contribute to the false belief that gambling outcomes can be influenced (Toneatto, 1999).

Therefore, gamblers attempt to control and predict events by developing superstitious beliefs that motivate them to develop strategies to increase their winnings (Xian et al., 2008). These concepts are presumed to contribute to gambling problems by affecting the gamblers' interpretations of their chances of winning, their subjective feeling of control over outcomes, their attributions for failure, their justifications for continuing, and their estimations of their skills or abilities (Breen et al., 2001; Cunningham et al., 2014; Toneatto, 1999).

Many studies have highlighted the positive relationship between both gambling and cognitive biases in many samples of gamblers from different settings, such as gamblers in treatment or in rehabilitation centers (Joukhador et al., 2003; Myrseth et al., 2010; Toneatto et al., 1997), or in the general population (Cunningham et al., 2014). These studies have demonstrated the key role that cognitive distortions play in gambling behaviors.

Following this premise, this study aimed to verify if pathological gamblers present higher levels of cognitive distortions than non-pathological gamblers in an Italian sample, a context in which pathological gambling has received less attention from scientific literature compared to the Anglo-Saxon context.

According to existing data, our results revealed that pathological gamblers have higher levels of cognitive distortions than non-pathological gamblers, suggesting that gamblers think that they can control gambling outcomes via personal skill, ability, and knowledge (*Illusion of control*). Such belief is the most prevalent and destructive cognitive distortion linked to gambling behaviors (Toneatto et al., 1997). Moreover, pathological gamblers tend to predict gambling outcomes starting from salient past wins or losses, and believe that a series of losses foretells an imminent win (*Predictive Control*). They tend

to attribute wins to one's skills and losses to external influences (*Interpretative bias*), and to believe that gambling is the only way to cope with stress, in order to justify their behavior (*Gambling Expectancies*). In particular, this study identified the impact of the variables *Perceived Inability to Stop Gambling* and *Gambling expectancies* on gambling behaviors. These results suggest that attention should be paid to these cognitive distortions in the treatment of pathological gambling, in order to improve the efficiency of intervention.

5. FUTURE RESEARCH DIRECTIONS

Despite the documented relationship between gambling behaviors and cognitive distortions, the direction of this relationship remains unknown, and little is known regarding the role that cognitive distortions play in the onset, development and maintenance of gambling behaviors. Recently, Xian and colleagues (2008) examined the onset and development of gambling behaviors and the co-occurrence of gambling-related irrational beliefs and attitudes, suggesting that these cognitive distortions could be considered significant risk factors of pathological gambling. However, little is known about the existence and functioning of these cognitive biases, and, in particular, if irrational beliefs are consequent or pre-existent to the pathological gambling onset, and which is the causal link between these erroneous thoughts and the gambling behaviors.

Beginning with this consideration, it would be useful to explore such issues. To this purpose, it would be desirable to implement a longitudinal study allowing further exploration into the relationship between cognitive distortions and biases and gambling behaviors, following a sample of gamblers in the transition from social to pathological gamblers. A broader understanding of the relationship between cognitive distortions and gambling behaviors could facilitate the implementation of interventions for prevention and treatment of gambling problems.

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